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PRELIMINARY RESULTS FROM THE TRANSENDOCARDIAL INJECTIONS OF AUTOLOGOUS WHOLE BONE MARROW AND MESENCHYMAL STEM CELLS IN ISCHEMIC HEART FAILURE (TAC-HFT) TRIAL

ACC Poster Contributions
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Session Title: Emerging Nonpharmacological Treatment for Heart Failure
Abstract Category: 24. Myocardial Function/Heart Failure—Clinical Nonpharmacological Treatment
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Background: We assessed the preliminary efficacy of transendocardial injections of autologous bone marrow mononuclear cells (BMMC) and bone marrow derived mesenchymal stem cells (BM-MSC) in patients with ischemic cardiomyopathy.

Methods: Eight patients (age 57.2±13.3, all male) with chronic left ventricular (LV) dysfunction secondary to previous myocardial infarction were enrolled in this open label phase I study. The BioCardia Helical Infusion Catheter was used to inject the infarct and border zone with BMMC (100 or 200 million cells, n=4) or in-vitro cultured BM-MSCs (100 or 200 million cells, n=4). Efficacy was assessed by 6 and 12 month cardiac magnetic resonance (CMR) imaging changes in global and regional LV function and scar size.

Results: CMR demonstrated a decrease in end-diastolic volume (208.7±20.4 vs. 185.3±20.6 vs. 167.4±7.32mL at baseline, 6 months, and 12 months, respectively; p=0.033) and improved regional LV function in the infarct zone by peak Eulerian circumferential (Ecc) strain of tagged CMR (-8.1±1.0 vs. -11.7±1.2 vs. -11.4±1.3; p=0.038). There was a trend towards a decreased end-systolic volume (142.4±16.5 vs. 124.7±19.4 vs. 107.6±7.4mL; p=0.058), and no change in ejection fraction (32.5±2.4 vs. 34.2±3.4 vs. 35.9±3.1%; p=0.532) or LV mass (193.3±10.8 vs. 198.2±13.1 vs. 193.8±10.4g; p=0.77). Delayed hyperenhancement CMR demonstrated a non-significant decrease in scar size as a percentage of LV mass (15.05±5.13 vs. 13.16±4.37 vs. 11.25±4.70%; p=0.292) and as an absolute scar volume (21.3±6.9 vs. 19.7±7.22 vs. 16.5±7.24ml; p=0.557). A linear regression plot of the percentage change in EDV and ESV vs. change in peak Ecc of the infarct zone demonstrated a significant correlation (r2=0.521 and r2=0.685, respectively; p<0.01).

Conclusions: This data suggests that catheter-based intramyocardial injections of BMMC and BM-MSCs in patients with ischemic cardiomyopathy may improve LV chamber sizes and regional function.